INTERNATIONAL CIVIL AVIATION ORGANIZATION

TWENTY NINTH MEETING OF THE ASIA/PACIFIC AIR NAVIGATION PLANNING AND IMPLEMENTATION REGIONAL GROUP (APANPIRG/29)

Bangkok, Thailand, 3 to 5 September 2018

Agenda Item 3: **Performance Framework for Regional Air Navigation Planning and Implementation**

3.4: **CNS**

THE NECESSITY OF HARMONIZATION FOR IMPLEMENTATION OF NEW OPERATIONS

(Presented by Japan)

SUMMARY

This paper identifies the need for appropriate support, evaluation, and an implementation strategy for System-Wide Information Management (SWIM), Flight and Flow-Information for a Collaborative Environment (FF-ICE), and Trajectory-Based Operations (TBO). These new technologies will change the business and system environment of all stakeholders significantly. States are urged to engage industry stakeholders in establishing clear objectives for quantitative and qualitative benefits on deployment processes of SWIM and FF-ICE toward the TBO. ICAO is requested to ensure there is an appropriate level of support for the new Standards and technological implementations, so that they can be applied in an efficient and Cost-Beneficial manner.

Strategic Objectives:

B: ***Air Navigation Capacity and Efficiency****—Increase the capacity and improve the efficiency of the global aviation system*

1. INTRODUCTION

1.1 In today's information exchange environment, we believe there is a limited amount of information being exchanged among stakeholders, such as ATM service providers, aircraft operators, airport authorities, military, and so on. Stakeholders recognize that there is a gap of information being exchanged between operators and ATM. The inability to update distributed information such as flight plans by FMS and filed FPL etc., between ATM providers is a hindrance to operators when updating their flight plans, and route negotiations. When looking solely at airports, we see that A-CDM has been gradually introduced to assist in the ground operation, however here again, information integration between Airports and ATM is limited.

1.2 The information gap does not end at continental boundaries. In a similar fashion, operators find an information gap existing between FIRs and Regions. There are questions: how much updated information can a stakeholder have; how much flight information can be shared between FIRs without overloading the system? Unfortunately, although the latest technologies can support a certain level of information exchange, the sharing of information is still restricted

technically and operationally. These information exchange limitations make all stakeholders lose the best use of capacity, and capability.

1.3 Limited area of information, limited data due to the lack of global data formats, limited timeliness and limited interexchange between all stakeholders, it makes us all share information in inefficient and limited ways. We lose opportunities of the utilization of capacity and capability due to limited information. When one can share valuable data between stakeholders in a timely manner, we can utilize our capacity and capability in more efficient ways.

2. DISCUSSION

2.1 The introduction of SWIM and FF-ICE is based on the ICAO Global Air Navigation Plan. SWIM provides users access to relevant and mutually understood information in an interoperable manner. FF-ICE defines information requirements for flight planning, flow management and trajectory management and aims to be a cornerstone of the performance-based air navigation system. SWIM and FF-ICE will support stakeholders in sharing similar data/information globally, with a high level of automation and integration, and will support the collaborative decision making between stakeholders. In order to achieve the above objectives, a single global governance rule is required. In addition, in order to assure compatibility between system and stakeholder implementations, a clear cost benefit of these technologies should be presented to stakeholders, which would permit them to justify where their investments towards introduction of new technologies should be directed.

2.2 The further development of SWIM and FF-ICE, hinges on a number of associated aspects. It is important to conduct impact assessments on SWIM/ FF-ICE technology to ensure there will be an operational improvement on ATM and Aircraft operations. For an operational implementation of FF-ICE, all stakeholders should have a common understanding of the development; method of transition, efficiency and usability of FF-ICE, and the associated cost benefit. In addition, the data required to be exchanged between stakeholders, should be evaluated based on the need, and alternate data sources. A review should be conducted with current available data with the intended purpose to validate the function through a trial of SWIM and FF-ICE. In the future, ATM systems will support operational enhancements like capacity and flexibility via FF-ICE information together with new IT technology. The goal is to use FF-ICE data to improve airspace operations and increase airspace capacity.

2.3 The introduction of new technologies like SWIM and FF-ICE identifies several critical points related to investment, development and cost benefit as follows:

2.3.1 A question remains regarding how FF-ICE will be implemented via SWIM. In order to achieve connectivity, all stakeholders will be required to develop, or subscribe to new applications that allow them to connect to the SWIM framework. Once connected to a SWIM platform, FF-ICE would be enabled. However, we understand the development of applications are costly and time consuming. In order to begin assessing whether FF-ICE is achievable, stakeholders need SWIM networks to be established in advance;

2.3.2 In order to achieve benefits from the onset, we accept that there will be an initial expenditure for stakeholders. However in order to adequately assess whether FF-ICE provides the benefit, a long list of services will be needed such as; flight plan system upgrades that include in-flight monitor with real-time updates; provision of enhanced information services including AIS, MET and Airspace; improved trajectory planning; enhanced airspace /airport operations; and the SWIM enabled enhanced network. The ability for operators to implement these improvements, will be directly tied to the achievable cost benefits. This would also provide an opportunity for operators and ANSPs to determine the most cost beneficial avenue to progress beyond SWIM and FF-ICE;

2.3.3 There is also a need for more detailed data descriptions for the subject matter expert level, who needs enough information about the available data elements in the various SWIM feeds, to identify value scenarios and build business cases for making the internal investments. Establishing the capability for the future TBO (Trajectory Based Operations), requires much more than building systems to use and process flight plan trajectories. There are many processes, procedures, and quite a lot of training in addition to a host of other considerations, that will have to be addressed in order to bring TBO into daily operations;

2.3.4 In the future, it is envisioned that TBO will permit trajectories to be automatically calculated, which would allow them to be negotiated and agreed upon between Operators and ANSPs in advance. However there will also be a need for an internal system interconnectivity, which would permit an airline to manage the required information, before it would be shared with external stakeholders; and

2.3.5 If considering an aircraft as a SWIM node, aircraft connectivity will be required in order for information to be shared between the cockpit and AOC, and between the airplane and ATC, for a full TBO concept. However, this may also be accomplished utilizing an internal network to SWIM technology. And stakeholders will need to have clarification of the future view of IP technology for use over SWIM and Datalink for cockpit communications, for a stakeholder to consider their investment.

2.4 We can see the impact not only on the system, but also on the processes used by each stakeholder in providing the data over SWIM. Technology is the enabler to achieve an operational improvement, however the environments of information quality, airspace capacity and flexibility, might restrict the benefits from being realized. For assuring the intended benefit from technology, all stakeholders should evaluate and improve the operational environment. Of note, there will be a need for all stakeholders to consider the emerging issues related to cyber security. Although industry and ICAO have both initiated work programs, the outcomes will have a direct impact and affect the intended benefit from SWIM technology.

2.5 Clear Objectives and operational improvements, need to be defined and established. In order to maximize the benefit for all stakeholders, we need to consider a regional and cross regional approach. This should be prioritized and based on key global and regional traffic flows, for both users and ATM.

3. ACTION BY THE MEETING

3.1 The Meeting is invited to urge States to engage industry stakeholders in establishing clear objectives for quantitative and qualitative benefits on deployment processes of SWIM and FF-ICE toward the TBO.

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